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NOTE BY THE SECRETARY-GENERAL

The Secretary-General has the honour to transmit to the members of the Security Council the attached communication which he has received from the Director-General of the International Atomic Energy Agency (IAEA).

Annex

Letter dated 26 April 1993 from the Director-General of the International Atomic Energy Agency addressed to the Secretary-General

Please find attached the report of the eighteenth IAEA inspection in Iraq under Security Council resolution 687 (1991). You may deem it appropriate to transmit the report to the members of the Security Council. I remain, of course, available with the Chief Inspector, Mr. Demetrius Perricos, for any consultation you or the Council may wish to have.

(Signed) Hans BLIX

Appendix

REPORT ON THE EIGHTEENTH IAEA ON-SITE INSPECTION IN IRAQ
UNDER SECURITY COUNCIL RESOLUTION 687 (1991)

3 - 11 March 1993

SALIENT POINTS

- The team spent eight days in Iraq from the 3 - 11 March and despite the loss of one full day because of Ramadan most of the planned activities were carried out. By splitting the team into 3-5 groups working in parallel, 35 sites were inspected. Helicopters were used extensively.

- Three facilities were inspected for the first time, including the Saddam University in Baghdad. During this visit, the Iraqi side attempted to restrict access rights of the inspection team, but they quickly changed their position and the inspection proceeded without difficulty.

- An inspection at the Hatteen Establishment, which was a follow-up on a quantity of RDX explosives stored there was extended to include workshops. The workshops were found to contain 242 machine tools, a large number of which, in the opinion of the team, should have been included as dual-use items in the declarations made by Iraq under Annex 3 of the Agency's long term monitoring plan approved in UNSC resolution 715. The machine tools were identified and the specifications will be evaluated.

- Activities aimed at verifying new information provided by the Iraqi side in their January 1993 Annex 3-related declaration were carried out at a number of sites. Short notice inspections were used to monitor the utilization of machine tools and to verify that the equipment was not being used for proscribed purposes.

- A number of sites were inspected as part of an on-going investigation as to whether any type of nuclear facility (not only reactors) had been built underground. The immediate in-field conclusions were negative.

- A major effort concentrated on identifying and separating a large number of radiation sources. Those which are permitted for use in applications in agriculture and industry, will eventually be released according to established procedures. Other sources such as radium, tritium, etc., will be kept under IAEA control.

- A number of technical discussions took place covering areas such as inadequacies in the Iraqi Annex 3-related declarations, long term monitoring procedures, the assistance to be provided by Iraq on the removal of irradiated fuel, nuclear material balance inconsistencies and Iraqi studies involving uranium tritide.

- Regrettably, no progress can be reported on the provision by Iraq of information about foreign procurement and its procurement network. In this area, Iraq is still far from complying with the request of the IAEA. The IAEA-18 team requested, in writing, detailed procurement information for all equipment, components and raw materials, listed in Annex 3, which were used or intended for use in nuclear related research, development and production. The information requested covered not only the manufacturers' names, but the names of intermediate suppliers and other companies in the procurement chain. Information on companies and individuals that provided technical advice on procurement, utilization and design information was also requested.

  As a matter of priority (and as a demonstration of forthcomingness), the Iraqi authorities were again requested to provide answers relevant to the procurement of maraging steel.

  The Iraqi side replied that the IAEA had a great deal of information on the subject including that obtained from outside sources. They considered that these questions were too general, that dealing with such general questions was impractical and that such an attitude was aimed at maintaining the conditions for continuance of the embargo. A copy of this correspondence is provided as an attachment to this report.

INTRODUCTION

1. This report summarizes the results of the eighteenth inspection mission carried out in Iraq by the IAEA under United Nations Security Council resolution 687 (1991) with the assistance and co-operation of the Special Commission of the United Nations. The mission took place from 3 to 11 March 1993 and was headed by Mr. Demetrius Perricos of the IAEA as Chief Inspector. The team consisted of 23 inspectors (comprising 12 nationalities) and support staff.

2. The objectives of the mission were broadly:

- perform activities concerning the inventory of materials, equipment and machine tools relevant to the revised Annex 3 of the Agency plan for ongoing monitoring and verification of Iraq's compliance with paragraph 12 of part C of United Nations Security Council resolution 687 [1991]. This plan was approved in UNSC resolution 715 [1991].

- follow-up activities on the nuclear material balance;

- carry out short notice inspections at selected sites to monitor the utilization of equipment and to verify newly available information on equipment and materials;

- carry out a nuclear inspection for the first time at a university site - the Saddam University;

- discuss with Iraqi counterparts the Annex 3 updating, including clarification of their declaration and its completeness, plans and requirements for implementing the long term monitoring, and discuss questions raised by ongoing analysis of data in Vienna;

- carry out a systematic search of several sites where information suggested that underground facilities, including a possible plutonium production reactor, might be concealed;

follow-up activities on weaponization.

3. Inspections were carried out at 35 sites. These are listed in Table 1.

Table 1
List of sites inspected

1. Tuwaitha, including locations B and C
2. Ash Shakyli storage
3. Al Nafad storage
4. Al Hamath
5. Tarmiya
6. Ash Sharqat
7. Al Atheer
8. Al Jezira
9. Al Rabiyah
10. Al Dijjla
11. Nassr State Establishment (Taji)
12. Al Qa Qaa
13. Al Hatteen Establishment
14. State Enterprise for Heavy Engineering Equipment (Daura)
15. Badr
16. Al Meelah Centre (new name for what used to be part of Badr)
17. Auqba bin Nafi State Establishment
18. Iskandariya Car Factory
19. Salah al Din Electronics Plant (SAAD-13)
    Salah al Din Housing Project (SAAD-14)
20. Al Kindi Establishment (SAAD-16)

21. Ibn Al Haytham Centre

22-25 Four sites identified in a nuclear power plant siting study - Baiji
Abu Dalaf
Al Mihzam
Al Abbasiya

26. Saddam University
27. Fallujah Lead Recovery Plant
28. MIC Stores (North of Baghdad)
29. Kahn Dari Warehouses
30. Al Rafah Centre (part of Saddam State Establishment)
31. Jaber bin Haythan (SAAD-24)
32. Badoush Dam
33. Al Musayyib Power Plant
34. Dhu Al Fiqar (part of Saddam State Establishment)
35. Al Ameer Factory (part of Saddam State Establishment)

ACTIVITIES RELATED TO WEAPONIZATION

4. The team made a monitoring inspection at the Al Kindi (SAAD 16) establishment just north of Mosul. Al Kindi is a facility for military research and development, in particular, the pyrotechnics and propellants used in rockets. The site has been thoroughly reconstructed after severe destruction during the Gulf War. The facilities at the site have features that could be useful in development of small quantities of explosives such as those used in a nuclear weapons development program. It also has some good quality machine shops for fabricating non-explosive materials, an electroplating capability and a primitive capability for the machining of high explosives. The reconstruction effort has proceeded since the visit in November 1992. More buildings have been completed and additional equipment has last been installed. No nuclear related activities prohibited under UNSCR 687 were observed.

5. The former PC-3 nuclear program published an extensive design study for a project to produce and store uranium tritides. Storage of hydrogen through absorption on uranium metal powders is a well-known technique. The Iraqi program manager and design engineer described their plans to the inspection team for handling millicurie

quantities of tritium for self illuminating signs and markers. They produced samples of such signs that they said contained tritium purchased in millicurie amounts from commercial suppliers. They claimed that the design study available to IAEA was in support of this program. The design study is, however, for quantities of tritium on the order of tens of thousands of curies. The required technologies for the two applications are very different, quantitatively and qualitatively. This discrepancy was pointed out to the Iraqi side, who strongly maintained that the purpose was exactly as stated. The Iraqi version does not address the questions of the inspection team. Therefore, a possible conclusion may be that the uranium tritides project design study was in direct support to the Iraqi nuclear weapons development programme. The inspection team also raised questions regarding lithium separation activities and subsequent irradiation. The Iraqi response was that they never contemplated much less carried out such work.

6. Approximately 250 tonnes of HMX (High Melting Point Explosive) remain under seal in six bunkers at the Al Qa Qaa high explosives plant near Al Musayyib. The Iraqi side requested access for a safety inspection because the material has been locked up without safety checks for over a year. The seals were removed to allow this inspection and the bunkers were resealed. The Iraqi side has requested the release of this material for civil applications but they have not responded to IAEA requests for more specific information.

7. The inspection team also examined for the first time a store of RDX high explosive maintained at the Al Qa Qaa site. RDX is a high quality explosive with many applications. Its use in Iraq is subject to monitoring by IAEA under the requirements of the long term monitoring plan. A sample was taken. The RDX manufacturing facility at Al Qa Qaa was destroyed during the Gulf War and it has not been put back into operation. A store of RDX being used at the Al Hatteen State Establishment in the manufacture of military ordnance was also inspected.

ACTIVITIES RELATED TO NUCLEAR MATERIALS

8. A primary and continuing objective of the IAEA inspections in Iraq is the verification of the correctness and completeness of Iraqi nuclear material declarations. The nuclear materials subject to safeguards inspection prior to the Gulf War are long since accounted for. None of the enriched materials, including highly enriched uranium (~ 45 kg U-235) in the form of fresh and irradiated reactor fuel, had been diverted to the Iraqi clandestine programme. The highly enriched fresh fuel was removed from Iraq in November 1991 (IAEA-8). Negotiations are progressing for the removal of the irradiated fuel during the remainder of 1993. The small quantity of plutonium (~ 6 g) produced in the course of the separation experiments at Tuwaitha has also been removed. With the exception of small quantities of natural uranium still to be recovered from waste at the Al Jezira site, all declared bulk uranium stock and intermediate process materials (total ~ 550 t uranium) have been verified and are maintained under seal at a single location. Most of this material, in the form of yellow cake, - about one-fifth declared after the Gulf War to have come from indigenous production and four-fifths from external sources - was never included in the pre-war safeguards inspection regime.

9. It is not possible to establish the completeness of Iraqi nuclear material declarations through traditional material accountancy. Efforts to independently confirm quantities of un-safeguarded nuclear materials (much of it in the form of yellow cake delivered to Iraq by external sources) have not been successful. Further, while daily production records for the Al Qaim facility have been presented and reviewed by inspection teams, there is no way to verify the completeness of these records. Considerable effort has been expended in an attempt to develop an internally consistent picture of how quantities of nuclear material from the different origins were utilized. This origin based accouniancy has largely been an effort to match inspection team measured material, presented in various physical and chemical forms, with Iraqi descriptions of material flows through the declared processes. The identification of a quantity of material with an origin is being done through highly precise isotopic and impurity measurements. The resulting picture does not provide assurance that all nuclear

materials have been declared and presented but inconsistencies do provide the technical basis and direction for looking further.

10. The Iraqi nuclear material flow chart changed considerably between the time it was first presented and the "full, final and complete" declaration (see Figure 1). The various revisions in the nuclear material flow chart were made by the Iraqi side in response to inconsistencies identified by inspection teams. With the "full, final and complete" declaration of June 1992 the Iraqi side's response to remaining inconsistencies was that "any differences in weights existing in the chart of nuclear material as verified by the Agency are attributed to either losses of the material during the bombing or mixing of the material during the evacuation or the inaccuracy of the analysis of the samples". They went onto say that they considered that the "nuclear material file is closed".

11. An accumulation of sample analysis data from precise measurements of uranium isotopics and impurities in selected samples are now casting doubt on major elements of the Iraqi side's nuclear material declarations. The declarations in question involve the activities, identified as the "30 July Project" (see Figure 1 and the twelfth inspection report) carried out in the building 73 complex - Tuwaitha (Figures 2 and 3) and a large quantity of UO_2 reportedly imported from Brazil. A description of the specific declarations and the verification findings follows:

Declarations: Building 73a was involved in a variety of fuel fabrication activities utilizing 2,260 kgs of natural uranium (UO_2) from Italy (safeguarded material) and 59 kgs of natural uranium (UO_4) from Akashat/Al Qaim (non-safeguarded material). The 37 air filters (ref. 1 of Figure 1), containing ~ 50 kg of natural uranium and currently stored under Agency seal at Location C, were declared to have been installed in building 73a. In addition, waste associated with the activities of buildings 73a and 73b was presented.

Verification Findings: The natural concentration of the uranium isotope U-234 is constant within a single uranium ore deposit but highly variable across geographical separate ore bodies (see for example L.U. Joski, et al

J. Radioanal. Chem., 67 (1981) 47 and 79 (1983) 317). Figure 4 shows U-234/U-235 isotopic ratio measurements for 3 samples of the Italian UO_2, 3 samples of the Akashat/Al Qaim UO_4, samples from 8 of the 37 air filters declared to have been installed in building 73a and 2 samples of waste slurry identified with building 73a activities. The results shown in Figure 4, with further confirmation provided by the impurity analyses, clearly contradict the Iraqi side's declaration that the bulk of the material utilized in building 73a was of Italian origin. Either the filters were installed elsewhere than declared (the Iraqi side has indicated that there was no filtration system in building 73c) or the activities carried out in building 73a involved extensive and undeclared utilization of material other than or in addition to the Italian UO_2. It is possible that the additional material processed in building 73a was associated with the Iraqi uranium metallurgy programme and this could indicate a much larger violation of the safeguards agreement than was disclosed at the time of the eleventh mission.

Declaration: Iraq received 23.5 tonnes of natural uranium as UO_2 from Brazil. A quantity amounting to 3.4 tonnes was processed for the enrichment programme (presented mainly as UCl_4 or ADU). The remaining 20.1 tonnes, contained in 201 drums, was never processed.

Verification Findings: The total quantity of uranium verified as contained in the 201 drums is 18.2 tonnes, not the 20.1 tonnes declared. Moreover, when the randomly selected drums were opened for sampling, inspectors noted that material was present in three distinctly different physical forms:

- fine powder;
- granulated material; and
- a mixture of the granulated material and powder.

The Brazilian uranium originates from monazite ore and, as such, should contain traces of thorium. Impurity analyses indicate that the granulated material contains significant amounts of thorium while the fine powder contains no thorium. In fact, the broader impurity results suggest that the fine powder is Iraqi UO_2 produced at Al Jezira. During the eighteenth inspection every one of the 201 drums was opened and the physical form of the material noted. An additional 16 samples were collected. Preliminary results suggest that at least two-thirds of the material presented as Brazilian UO_2 had some other origin.

12. The verification data from the building 73a filters and the Brazilian UO_2 were discussed at length with the Iraqi side. They indicated that they could not dispute the results but could offer no explanation either. They reiterated at length that all nuclear materials in Iraq had been declared and presented. Formal requests for clarification and the corresponding responses were along the lines taken in connection with the full, final and complete declaration. They indicated that part of the material was recovered under difficult circumstances and that some mixing was unavoidable.

13. Since the third inspection (July 1991) a large number of radiation sources had been maintained under seal in building 33 at Location C adjacent to the Tuwaitha Center. The Iraqi side has, on several occasions, requested the release of specific sources for medical and agriculture applications. A major effort undertaken in the course of IAEA-18 was the verification of the gamma and neutron sources. The large quantity of equipment necessary for this task was transported from Vienna. With the exception of some large drum sources, a few alpha sources and one container where Co-60 pellets are stored (Iraqi declaration), all sources were verified. The original activities range from a few tenths of a μ Ci to more than 1000 Ci. The sources encountered were:

Number of Sources	Type of Sources
52	Co-60
32	Cs-137
22	Ra-226
16	AmBe
16	C-14
11	Eu-152
6	Ba-133
5	H-3
5	Sr-90
2	Cf-252
2	Ir-192
2	Hg-203
2	Na-22
2	Co-57
2	Th-232

Additionally, 7 uranyl compounds and a few other small laboratory and waste sources were found. All sources were catalogued, identified with a specific storage location and sealed. Most of the sources are allowed under UNSCR 687 and releasable subject to the appropriate requests from the Iraqi side and the necessary approvals from IAEA.

14. Other nuclear material related follow-up activities carried out during IAEA-18 included:

- the adjustment of water levels and the collection of water samples from the irradiated fuel storage containers at Location B and at the IRT-5000 reactor. In both instances water samples were collected to provide a continuing check on the integrity of the fuel cladding;

- the collection of an additional 12 samples of uranium metal to support the on-going investigation of the Iraqi uranium metallurgy programme;

- An inspection of the Tuwaitha waste treatment and storage facilities (buildings 36, 39 and 40). Activity levels were measured at a number of locations. A collection of uranium bearing air filters, sintering furnaces and glove boxes was discovered in building 36. Samples were taken for further evaluation.

- A quantity of uranium (0.7 kg LEU and 26 kg depleted) in a highly dilute nitric acid solution, recovered from EMIS operations at Tarmiya, had been stored in large tanks in building 62, Tarmiya (Figure 5) since the third inspection. The transfer of this material to Location C, Tuwaitha at the request of IAEA was confirmed by the eighteenth inspection team.

ACTIVITIES RELATED TO EQUIPMENT AND MATERIALS

15. The issue of procurement data was again discussed at length with the Iraqi side. The questions regarding the manufacture and supplier of the 350 grade maraging steel, specifically put forward in the context of the offer made to the Chief Inspector, IAEA-16, to clarify specific procurement issues, remain unanswered. Another formal request regarding procurement information for all equipment, components and raw materials listed in Annex 3, which were used or intended for use in nuclear related research, development and production was transmitted to

the Iraqi side during IAEA-18. The information requested covered not only the manufacturer's names, but the names of intermediate suppliers and other companies in the procurement chain. Information on companies and individuals that provided technical advice on procurement utilization and design information was also requested. The request and the Iraqi response are shown as Attachments 1 and 2.

16. The Al Rabiya mechanical workshop (a.k.a. Al Rabee and now called the Al Nidda Establishment) at Zaafaraniya was largely destroyed by a cruise missile attack on 17 January 1993. The facility was visited (27 January 1993) by the seventeenth IAEA inspection team which reported that the facility was being rapidly re-built through a huge, round-the-clock effort. An inspection by the eighteenth team was carried out to check on progress. All buildings have been re-built and handed over to the factory. The last building was completed on 4 March. A number of pieces of equipment that had been removed to the neighboring Al Dijjla facility in the aftermath of the bombing have been repaired and returned. No repair has been attempted on the large turning and milling machines (useful for machining EMIS components) because of a lack of spare parts.

17. A total of 14 inspections were carried out in connection with equipment and material verifications related to Iraqi Annex 3 declarations handed over to the inspection team at the conclusion of IAEA-17. A machine tool expert was included in the team for further technical evaluation of specific pieces of equipment. Two of the inspections involved equipment located in Ash Shakyli warehouse 14a and at Al Tuwaitha - buildings 9, 82 and 90. The remaining 12 inspections were focused on equipment and materials located in State Establishments:

1. Nassr Establishment (Taji)
2. Al Hatteen Establishment
3. State Enterprise for Heavy Engineering Equipment (Daura)
4. Badr
5. Al Meelah Centre (part of Badr - new name)
6. Auqba bin Nafi

* 7. Iskandariya Car Factory
* 8. Ibn Al Haytham
9. MIC North Baghdad Stores
* 10. Al Rafah Centre (part of Saddam State Establishment)
* 11. Dhu Al Fiqar (part of Saddam State Establishment)
12. Al Ameer Factory (part of Saddam State Establishment)

* - Short Notice Inspection

The six sites marked with an asterisk were visited on short notice as a test of procedures for the longer term monitoring of equipment utilization. No difficulties with access were experienced. The interval of time between notification and the team's entry into the first building housing equipment of interest varied between 6 and 11 minutes. With the exception of the inspection at Al Hatteen, the visits to the State Establishments were uneventful. Previous inspection team equipment inventories, Iraqi Annex 3 declarations and the equipment actually in place were mutually consistent. All sealed equipment was accounted for and the seals were intact. No nuclear activities prohibited under UNSCR 687/707 were observed. Samples of metal turnings were taken at several locations for further confirmation.

18. The nine vertical flow forming machines that had been removed from Taji prior to the 17 January attack on Al Rabiyah (see IAEA-17 inspection report) have all been returned and are partially installed. The horizontal flow forming machines at the Iskandariya Car Factory and the Al Rafah Centre are installed but are not being used. The one at the Al Rafah Centre is missing electronic components. The reconstruction of buildings at Dhu Al Fiqar has been completed. Equipment destroyed by UNSCOM ballistic missile teams has been transferred to a storage area for the salvage of components. Technical specifications and manufacturer information was collected on two jet moulding machines located at the Ibn Al Haytham. This was a follow-up item from IAEA-17. Additional technical data was collected on accessories for the large oxidation furnace (intended for the centrifuge programme) located at Daura.

19. One of the material declarations in Annex 3 pertains to 12 tonnes of RDX explosive in the possession of the Al Hatteen Establishment. This material is being consumed continuously in the manufacture of various military ordnance. At the time of the inspection, 49 boxes, each containing 40 kg of RDX were presented. Corresponding production records indicate a consumption rate of about 5 tonnes per month. The material is obtained from Al Qa Qaa which holds the primary stock. The RDX production facilities located at Al Qa Qaa were destroyed in the Gulf War. During the process of verifying the stock and utilization of the RDX the inspection team visited the production lines where the artillery shell casings are machined. The workshop contained about 50 MATRIX CHURCHILL machine tools that, according to the reporting requirement established by the IAEA, should have been included in their Annex 3 declaration (the Iraqi side has long contended that the Matrix Churchill machines at Taji and other places do not meet the specifications of Annex 3 and thus do not have to be declared). The discovery of these machines at Al Hatteen was discussed with the Iraqi side where, once again, the point was made by the inspection team that all such machine tools are to be declared with a remark that, in their opinion, the performance specifications require further study. The Iraqi counterpart stated that, except for those discovered at the Al Hatteen Establishment that day, no other machine tools, identified by the inspection team to be Annex 3 relevant, remained to be declared. The inspection team returned to Al Hatteen the next day to perform a more complete inventory. Three more workshops with installed machine were visited. A total of 242 machine tools were found. This includes 94 Matrix Churchill machines, series 3 or 4 (type variation up to type 7). The general environment in which the machines are being used is extremely poor. The specifications of the machine tools are being studied. Machine tools from other manufacturers found at Al Hatteen may be included in the Annex 3 declaration once the specifications have been evaluated.

20. The Iraqi Annex 3 declaration contains a number of pieces of equipment in Al Tuwaitha - buildings 9, 82 and 90 and in warehouse 14a at Ash Shakyli. Equipment presented and tagged with identifying seals include 2 quadrupole mass spectrometers (BALZERS), 3 digital time delay generators (AVIONICS) and 9 spark gaps (LUMONICS) being used in CO_2 lasers. All items were photographed and

manufacturer information was collected where possible. Due to the time required, follow-up on other equipment, particularly electronics equipment, was left for a future inspection. A more general effort to update records regarding the contents of the Ash Shakyli general stores was initiated during IAEA-18. Ten of the 25 or so warehouses were visited. Warehouse 13b has been cleaned-up and re-organized in preparation for the move of all reactor related components and spare parts to this location as requested by the seventeenth inspection team.

21. An outstanding item across several inspections has been the verification of an inventory of mixer-settler units (METALLEXTRAKTION AB) in Iraq consistent with procurement data obtained from outside Iraq. A number of mixer-settler units located at Tuwaitha and Tarmiya were presented to the eighteenth inspection team. The inventory, by location, is

UNIT	LOCATION			
	Ash Shakyli Warehouse 13b	Tuwaitha Building 9	Tarmiya	
			Building 57	Building 74
MSU-.3			20	
MSU-.5		27		
MSU-1.5	30			
MSU-5	40			15

The Iraqi side has declared that an additional 47 MSU-.5 units had been located in Tuwaitha and were destroyed during the war. The units located in buildings at Tuwaitha and Tarmiya are declared as being used for the purification of phosphoric acid. Units at Tarmiya are also declared as being used for the extraction of vanadium from coal ashes after leaching with phosphoric acid. Samples were taken from several of the units. Although some questions remain, the inventory of mixer-settler units together with the Iraqi declaration regarding the

destroyed equipment is consistent with the procurement data. An additional fourteen .5 liter MSU units are located in building 9, Tuwaitha but they are in very poor condition. The manufacturer of these units has not yet been identified.

22. The IAEA has made a proposal to the Iraqi side to utilize the Auqba bin Nafi State Establishment as a test site for the evaluation of the effectiveness of monitoring procedures and equipment. An Iraqi response is expected by the next inspection.

INSPECTIONS RELATED TO SEARCH FOR UNDERGROUND FACILITIES

23. Information suggesting the existence of a hidden nuclear facility co-located with the electronics factory and village at Salah al Din was the focus of a major inspection effort during the eighteenth mission. This inspection objective was addressed previously by the IAEA-10 team. The eighteenth team, which included new experts, thoroughly inspected the SAAD 13 electronics factory and confirmed this factory to be of normal construction which could not support the concealment of an underground facility. The SAAD 14 housing project adjoins SAAD 13. This housing project is served by several tens of kilometers of underground utility tunnels and a number of personnel shelters. Search teams investigated the shelters and walked through critical parts of the tunnel grid. No suspicious or unexplained features were discovered. No utilities, services or transportation capabilities that would be expected to be associated with a nuclear facility were found.

24. Information from a variety of sources suggest that a large dam under construction at Badoush, near Mosul, has a number of features that could be utilized to conceal an underground facility. A team, that included an expert in dam construction visited the site over a two day period. The team started with the large concrete power station section of the dam. The Iraqi side provided information about this construction project (about 50% complete) and responded to a number of questions regarding design and construction details. All features examined

were consistent with the stated purpose of a hydroelectric generating station. There was no indication that any section of the dam is being used to conceal hidden structures or entrances or that any of the observed features could have a secondary nuclear purpose.

25. The team also inspected the earthen embankment sections of the dam, portions of which are complete. These structures are large and could conceivably hide some sort of structure. The team found, however, that there were no signs of hidden structures based on evidence including lack of physical entrances, appropriate utilities, transportation, and geology. The search included an inspection of the Jaber bin Haythan (SAAD 24) complex immediately adjacent to one large piece of the dam. This site was inspected previously during the tenth mission. There is no sign that the earth structures have been used to conceal any prohibited activities. Jaber bin Haythan is a large facility dedicated to the production of chemical warfare protective gear. The teams observed a number of ordinary machine tools and plastic molding equipment. The site is very well equipped in terms of infrastructure but utilities and equipment are not compatible with a nuclear-related function.

26. In the 1980s the Iraqi Government engaged in a number of power reactor planning and siting studies. These were open activities, carried out with the assistance of several international companies. IAEA teams have often inspected one of these sites, Ash Sharqat, a site that was originally planned for a reactor but eventually developed for an electromagnetic isotope separation plant (a replica of the one in Tarmiya). The inspection team visited four sites (Baiji, Abu Dalaf, Al Mihzam, Al Abbasiya) declared by the Iraqi side to have been the final sites under consideration for constructing an electrical power producing reactor. None of the sites was under consideration for an underground reactor. This information was consistent with certain documents available to IAEA. The siting study was a joint effort with the former Soviet Union authorities.

27. The team visited the sites by helicopter. None of the sites showed any evidence of industrial development or construction activity. The only activities that had been carried out at these sites were geological surveys such as trenching and core sampling. Radiation measurements taken at each of the sites showed only normal background.

INSPECTIONS AT DESIGNATED SITES AND OTHER ACTIVITIES

28. The Iraqi university system apparently played a small role in the original clandestine Iraqi nuclear program. Recent information has suggested that parts of the program may have been dispersed to the national universities. Specifically, equipment was alleged to have been moved to Saddam University on the campus of the University of Baghdad. The College of Science at Saddam University was therefore designated by the Special Commission.

29. A team with escorts arrived at the University to conduct a no notice inspection of the site. The Iraqi escorts requested time to consult with the Minister of Education (who is also the Chairman of the IAEC) before granting entry to a university campus. Following a period of discussion, during which the Iraqi side tried to restrict the access rights of the inspection team, the IAEA team entered the university campus with six inspectors of varying technical backgrounds and with the condition that if any proscribed activity or equipment was found, then the rest of the team (7 more inspectors) would enter. Entry to the university campus occurred about 45 minutes after notification.

30. The inspection concentrated on the College of Science based on the information provided. The facilities proved to be small, frugally equipped laboratories, offices and classrooms. Equipment, notes, and instructions in the labs provided evidence that this is a teaching institution. The level of instruction appeared to be mostly undergraduate. The facilities were not adequate for graduate research or for a serious industrial development program. In addition, security at the facility was

inconsistent with any serious compartmentalization of classified activities. A few pieces of equipment were located that seemed out of place in this environment. They were of a slightly better standard and may well have been brought in from some defunct research site. The items noted tended to be in corners, still partly in packing boxes, and generally disused. The equipment is of little significance (probably not Annex 3 relevant but the specifications are being checked) and was not being used at the time of the inspection. The opportunity was taken to walk through the remainder of the campus which was largely deserted (most staff and students had departed for the weekend). Overall the facilities appeared consistent with the stated education function.

31. The team made a short notice inspection at the Fallujah Lead Recovery Plant about 30 km west of Baghdad. It was alleged that materials from the nuclear programme had been moved to this site. The team verified that the Lead Recovery Plant has only one function, the recycling of old lead-acid car batteries. All activities and materials at this site were consistent with that function except for a group of crates containing several tonnes of precision machined black plates believed to be graphite. All markings had been removed from the crates, but some labels that may identify the manufacturer were found nearby. Samples of the material were taken for analysis. The Iraqi side explained that the material was at the Lead Recovery Plant to be made into dry cell batteries, however, the plant does not make dry cell batteries and future expansion plans do not include this function. The Iraqi side was asked to provide the team with examples of batteries made with these materials but they refused to do so. The plates look very similar to the graphite sheets seen at Ash Shakyli by the third IAEA inspection team. It seems likely that the plates found at Fallujah are actually material dispersed by the Iraqis at the end of the war and they might have been procured for manufacturing ion sources and collectors for the EMIS program.

32. The IAEA team inspected the Khan Dari warehouse complex in the area of Abu Ghrayb for the first time. The site was declared to have been used by the IAEC and other ministerial entities as a receiving point for foreign shipments. This is consistent with its location west of Baghdad, very close to the airport and to the

railroad to Jordan. Documents available to IAEA implicated this site in the context of discussions regarding the collection and removal of documents. The site is declared today to be dedicated to reconstruction activities. The inventory of the complex consisted of large quantities of stainless steel in the form of sheet, bar, tubing, and pipe. There were many plumbing fittings such as unions, elbows, and tees. There were also large quantities of ordinary steel plumbing parts, welding rod, miscellaneous building materials, and a few simple process vessels. The inventory was consistent with a receiving warehouse designed to support corrosive chemical, processed food, and pharmaceutical plant construction.

33. Documents confiscated by the IAEA teams in Iraq indicate that the former PC-3 nuclear program had an interest in the Al Mussayib Thermal Power Station south of Baghdad. PC-3 was involved in the production of hydrogen gas at this site. The inspection determined that the hydrogen was being produced as part of a vendor supplied electrical generator cooling system. The equipment was consistent with normal industrial practice. There was no indication that hydrogen was produced for other purposes or that any further processing or isotope separation was in progress or under consideration. Excess hydrogen is available from this process because two of the plant's four generators were destroyed in the war. The Iraqis denied any PC-3 direct connection with the hydrogen production. No evidence of fluorine production was observed and the potential deuterium production capability at the site is too small to be useful to the nuclear programme.

34. The large nuclear weapons related buildings at Al Atheer were destroyed in mid 1992 under IAEA team supervision. The remaining offices, labs, and warehouses have been taken over by the Iraqi defense establishment as a helicopter maintenance center. The IAEA continues to monitor the site and the general purpose equipment there that dates from the nuclear weapons program. Machine tools and materials at the site were reviewed and catalogued. One CNC electric discharge machine may fall under specifications of Annex 3 and a review of its specifications is necessary. All other items moved to the site were found to be general purpose.

35. Inspections to monitor activities at the Tarmiya, Ash Sharqat and Al Jezira sites were carried out during the eighteenth mission. The Iraqi side is obviously proceeding with their plans to develop the sites for the alternative used described to the IAEA-16 and IAEA-17 inspection teams but the promised formal proposals have yet to be received.

Tarmiya - According to Iraqi statements this site is being turned into a national center for industrial chemistry R&D. Work in that direction is currently limited to some internal modifications to building 46 (Figure 5). Small scale chemical recovery work (purification of phosphoric acid and the recovery of vanadium from coal ash) is being carried out in building 74 and in an undamaged part of building 57. Other areas, equipment stores, etc. remain unchanged.

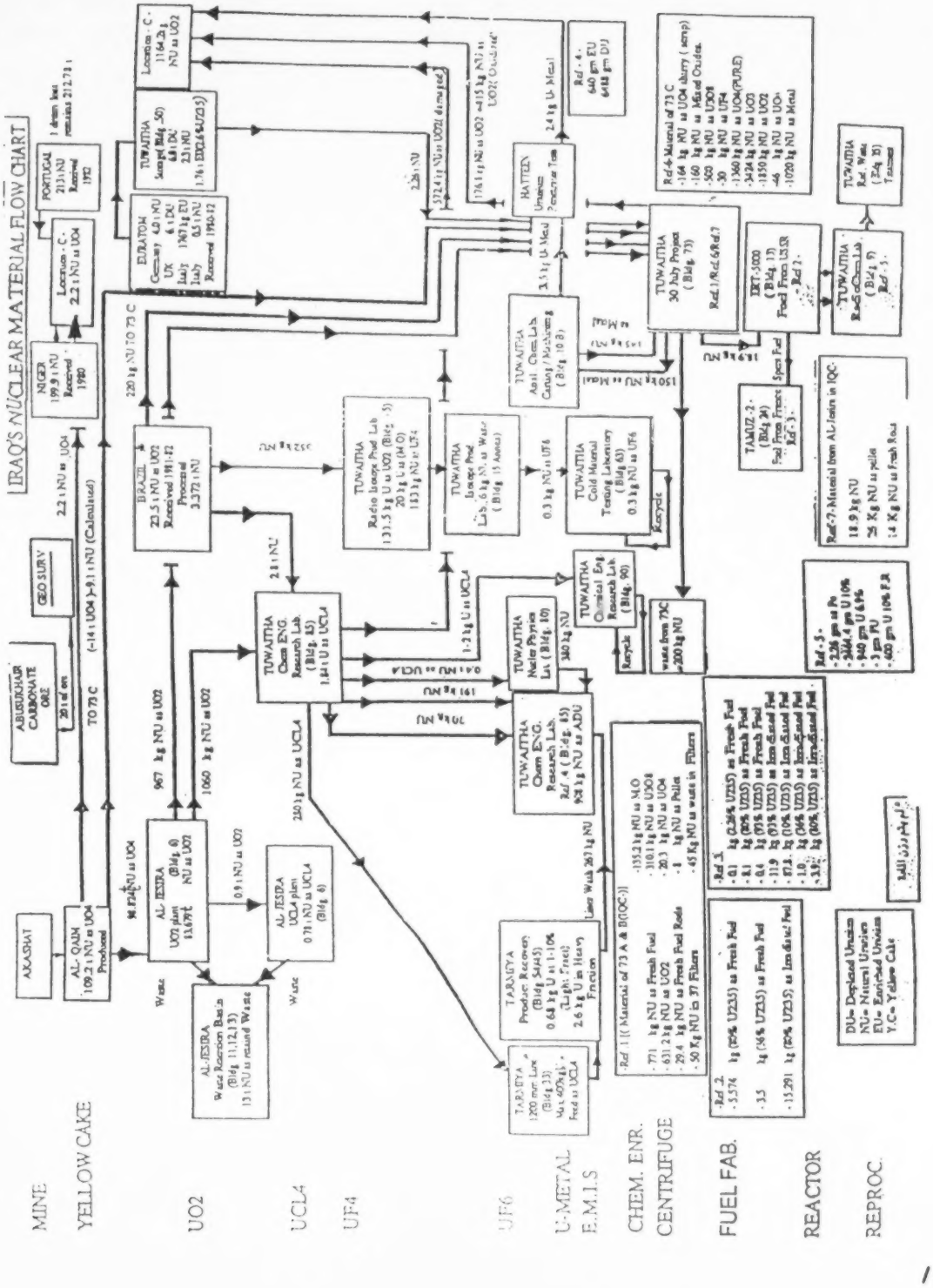
Ash Sharqat - Three areas - Area A (electrical and mechanical work shops), Area B (main production) and Area C (chemical recovery) - that comprised the Ash Sharqat site (Figure 6) remain unchanged. However, the Iraqi side has committed to the construction of a major new facility just to the east of Area C. Their statement is that the new facility will be for the production of ammonium nitrate and sulfuric acid. The total number of buildings planned for the facility is 44. The first stage of the construction involves 19 buildings. The Iraqi side's plan is for the civil works on the first stage to be completed within 3 months and for the facility to be operational within one year.

Al Jezira - As reported earlier the Iraqi side's plan for the Al Jezira site (Figure 7) is to establish a center for the development of processes to recover minerals from indigenous ores. A small construction effort involving a new administration buildings and some additional office space (adjacent to the quality control laboratory, building 16) is nearing completion. The new administration building is occupied. Other activities at this location involve the salvage of building materials and the razing of some still standing structures on the UCl_4 and UO_2 building sites. This work is in preparation to isolate these building sites with a fence per the agreement with the IAEA-16 inspection team.

36. Brief monitoring inspections were also carried out at the Al Nafad and Al Hamath sites. The situation at the Al Nafad site remains unchanged. The main building at the Al Hamath site has been used as a warehouse. The building is in the process of being cleaned-up and the contents moved to other storage locations in the Al Tuwaitha area (e.g. Ash Shakyli). According to Iraqi statements this action is in preparation for the building to be turned over to the IAEC agriculture research programme.

36. At the beginning of the inspection the Iraqi side was reminded that their first report required by Annex 2 of the long term monitoring plan was still outstanding. This report was promised to be delivered before the end of the inspection. This deadline was not met and assurances were given to the departing team that the Iraqi side would comply with the monitoring plan requirement within two weeks. The Annex 2 declaration was delivered to IAEA on 22 April 1993. The contents have not yet been evaluated.

FIGURE 1


IRAQ'S NUCLEAR MATERIAL FLOW CHART
MINE
YELLOW CAKE
UO2
UCL4
UF4
UF6
U-METAL
E.M.I.S
CHEM. ENR.
CENTRIFUGE
FUEL FAB.
REACTOR
REPROC.
AKASHAT
AL-QAIM
ABUDUKHAR CARBONATE ORE
GEO SURV
NIGER
PORTUGAL
EURATOM
BRAZIL
AL-JESIRA
TUWAITHA
TARMIYA
HATTEN
DU= Depleted Uranium
NU= Natural Uranium
EU= Enriched Uranium
Y.C= Yellow Cake

/...

Figure 2

Layout of the Building 73 complex presented by the Iraqi authorities

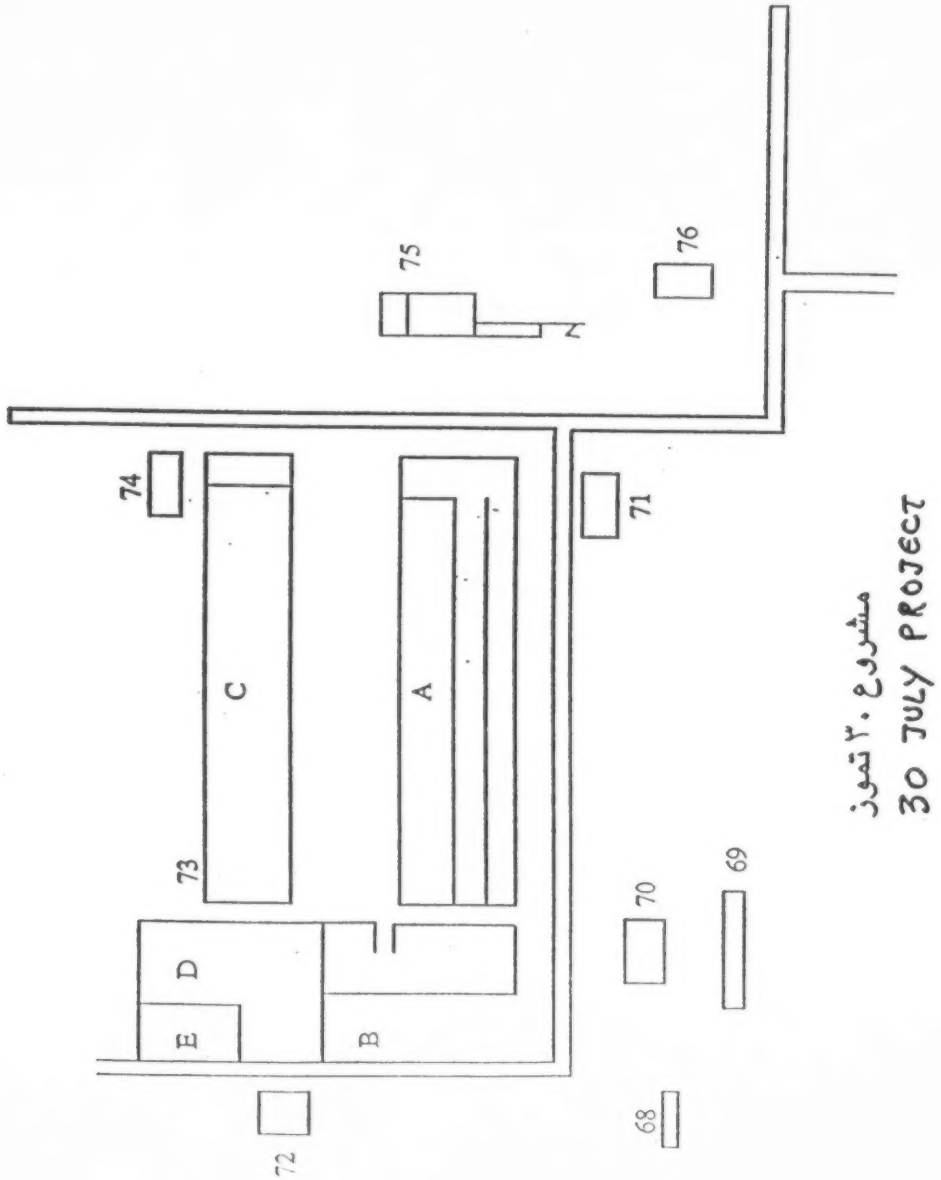


FIGURE 3

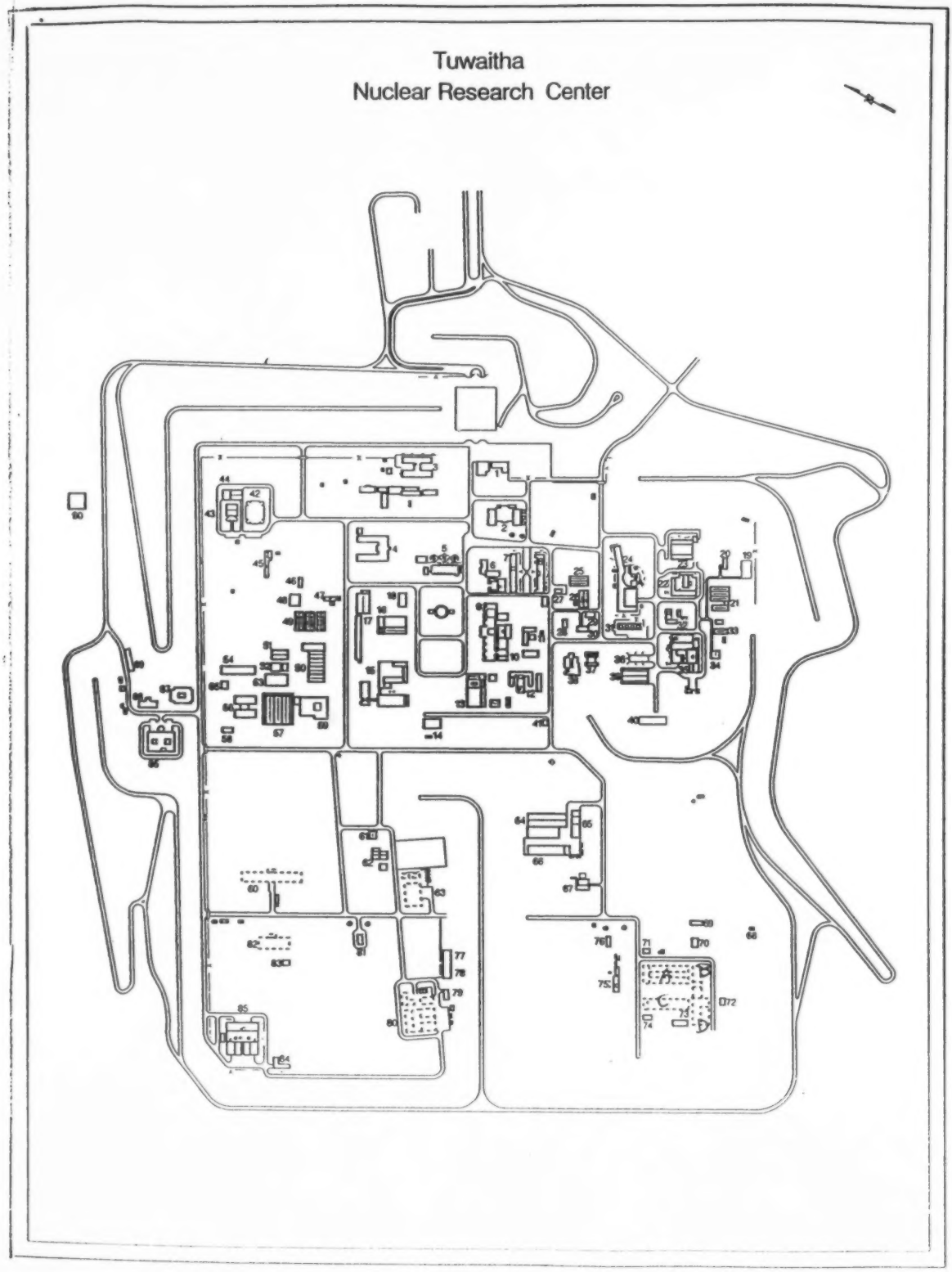


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FIGURE 4

U-234/U-235 Isotopic Ratios for Materials Associated with Building 73a

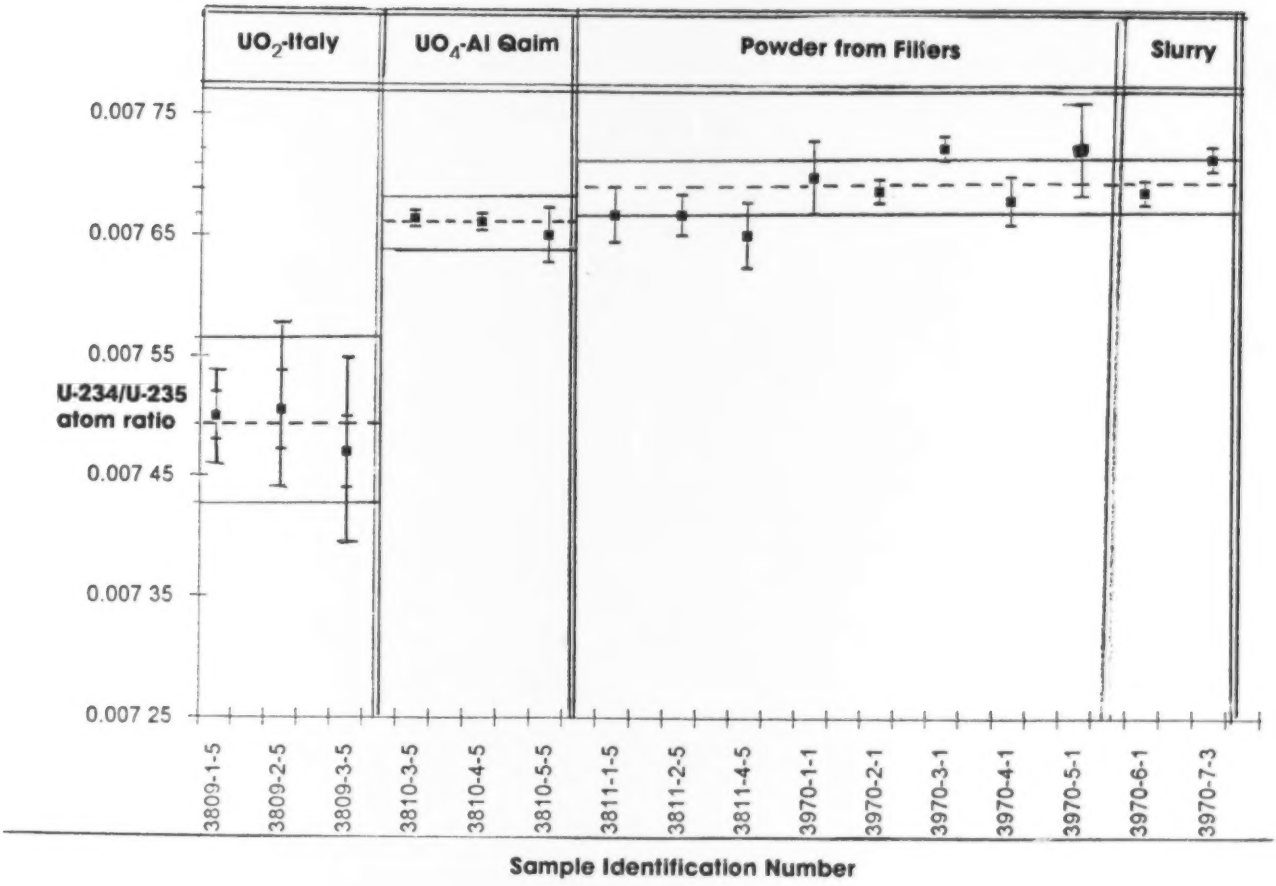

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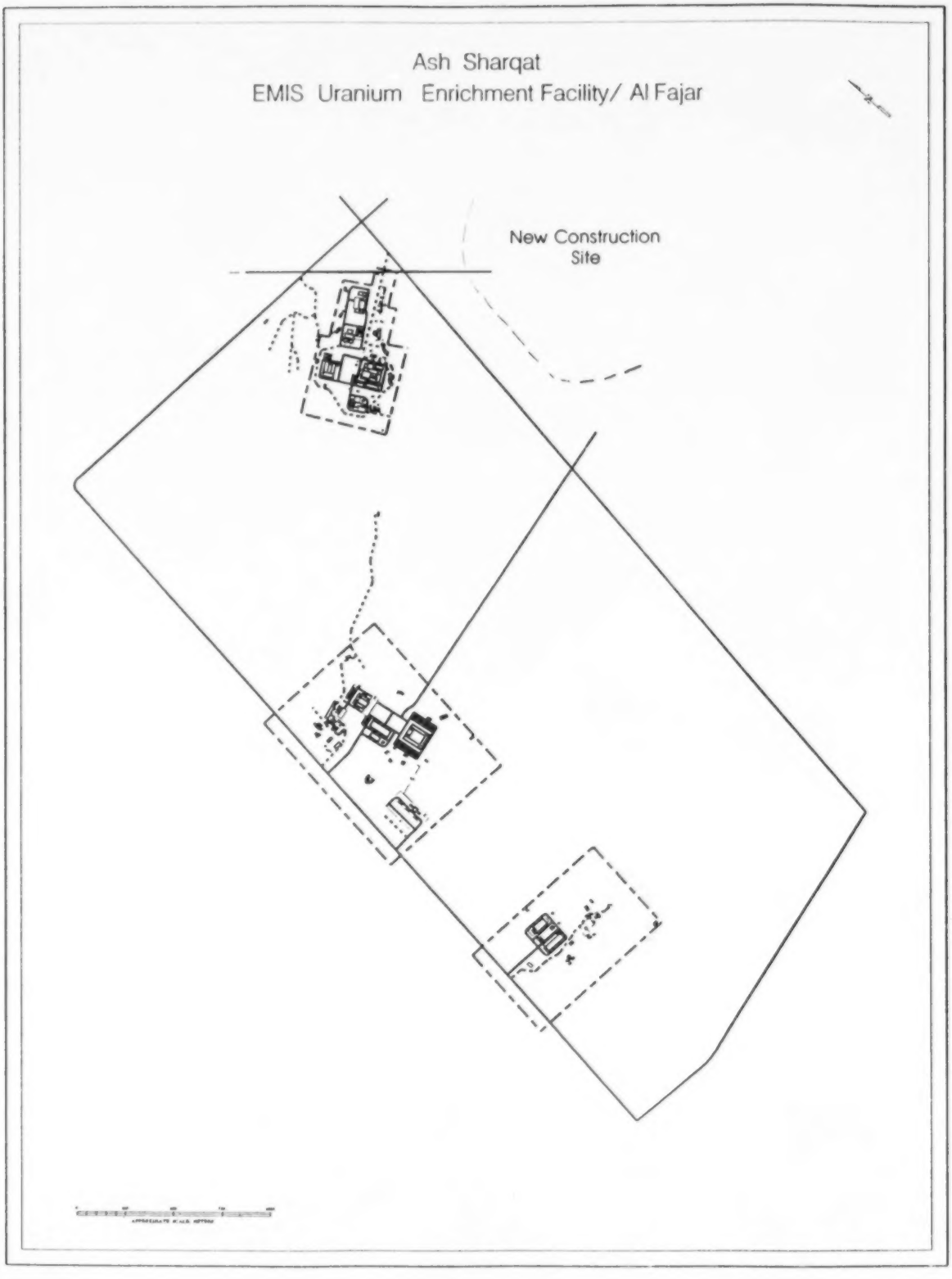
FIGURE 5

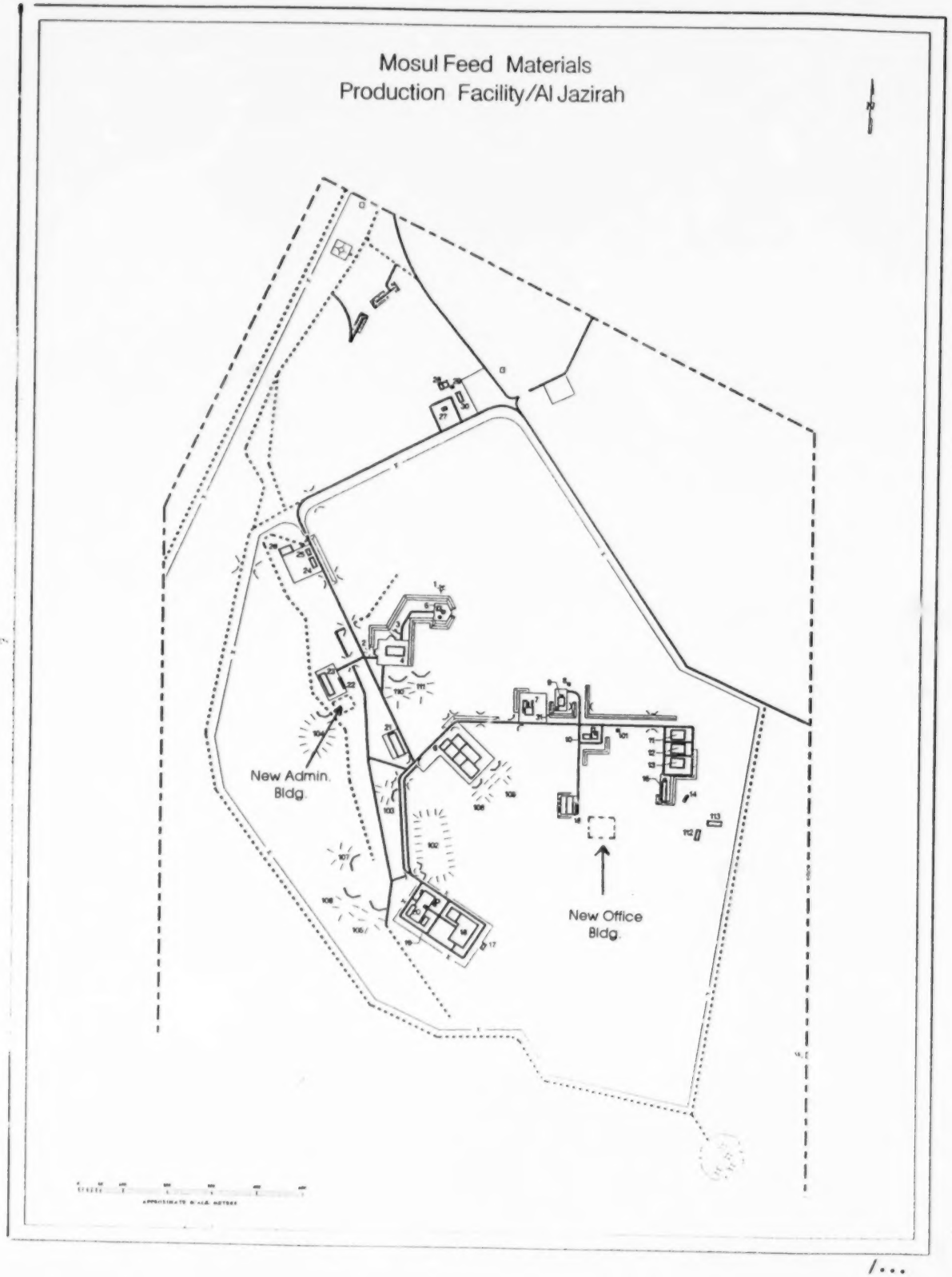
/...

FIGURE 6


Ash Sharqat
EMIS Uranium Enrichment Facility/ Al Fajar
New Construction
Site

/...

FIGURE 7


Mosul Feed Materials
Production Facility/Al Jazirah
New Admin.
Bldg.
New Office
Bldg.

/...

ATTACHMENT 1

IAEA-18 INSPECTION TEAM

6 March 1993

Dear Dr. Al Hajjaj,

I refer to previous discussions we have had, as well as the positive statements made by Dr. Ghaffour to Professor Zifferero during IAEA-16, on the issue of provision by Iraq of procurement data and of information on the relevant procurement network. I write now to reiterate the IAEA request for foreign procurement information that covers, inter alia, all equipment, components and raw materials which were used or intended for use in the Iraqi nuclear programme. This includes those equipment, components and raw materials used or intended for use in research and development, in the nuclear materials production facilities and in the manufacturing of components, for:

(1) Diffusion enrichment;
(2) EMIS enrichment;
(3) Centrifuge enrichment;
(4) Chemical enrichment;
(5) Reprocessing of irradiated uranium;
(6) Metallurgy of uranium and plutonium;
(7) Nuclear reactor systems - including critical and subcritical assemblies;
(8) Weaponization activities; and
(9) Chemical processes relevant to the above subjects.

For each relevant procurement, please provide the following information:

(1) A detailed description, including technical specifications, of the equipment, components or raw materials procured, including the number of items, auxiliary parts, weights and forms of raw material etc.;

(2) The name of the manufacturing company;

(3) The name of intermediate suppliers (if different from (2)) and any other companies in the procurement chain prior to final delivery):

(4) Date of procurement and date of arrival in Iraq;

(5) Date and location of initial installation or utilization and a description, where appropriate, of any installation assistance and training provided by companies and/or individuals from outside Iraq;

(6) Date of final installation (or storage) or utilization and the name of the location;

(7) The present location if different from (6);

(8) The identities of persons or companies that provided technical advice regarding the procurement and any subsequent utilization.

Guidance for equipment, components and raw materials to be included, is found in Annex 3 (July 1992) of UNSCR/715 (1991). All items should be included, even if they are not falling within the specifications stated in Annex 3, with comments from the Iraqi side about such cases.

In addition, please provide information on the provision of foreign engineering services, engineering drawings, construction contractors and architect engineers for all nuclear related installations (e.g. Tuwaitha, Al Jazirah, Tarmiya, Ash Sharqat, Al Furat, Al Atheer).

We hope to receive answers to these questions as soon as possible. However, by way of prioritization, we expect that the above answers, relevant to the procurement of the maraging steel material and manufacturing parts, already requested in Professor Zifferero's letter of 18 December 1992, will be provided to the IAEA-18 inspection team before its departure from Iraq.

Yours sincerely,

Demetrius Perricos
Chief Inspector
IAEA-18 Inspection Team

Dr. H. Al Hajjaj
Head of the Iraqi Nuclear Team
Baghdad

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ATTACHMENT 2

No. 2300/920/28

9 March 1993

Mr. Dimitri Perricos
Chief Inspector
18th Nuclear Team

Reference is made to your letter dated 6 March 1993.

Two years have elapsed since the inspection teams have been undertaking continuous work in Iraq. During the said period, the teams obtained a great deal of information about the subjects stated in your letter. Part of the information was given to you by us, while you laid hands on much of the information, in addition to those you obtained from outside sources. Therefore, dealing with general questions, as the ones included in your letter is impractical.

You now have a very wide data base on the subjects raised in your letter, while it appears from your letter as if we are starting from scratch. This is not an objective attitude and is incompatible with the actual state of affairs. It also contributes to the attempts aimed at maintaining the embargo on Iraq under non-objective pretexts.

I would like to refer to the meeting held between the Chairman of the Iraqi Atomic Energy Commission and Prof. Zifferero, during which we informed him that we hope to receive questions of specific nature, which we would give serious consideration.

Your letter, unfortunately, is very general. We hope to return to specifics in dealing with this subject.

With appreciation.

Abdul Halim Ibrahim Al-Hajjaj
Head of the Iraqi Side